



# Mr.Pro.

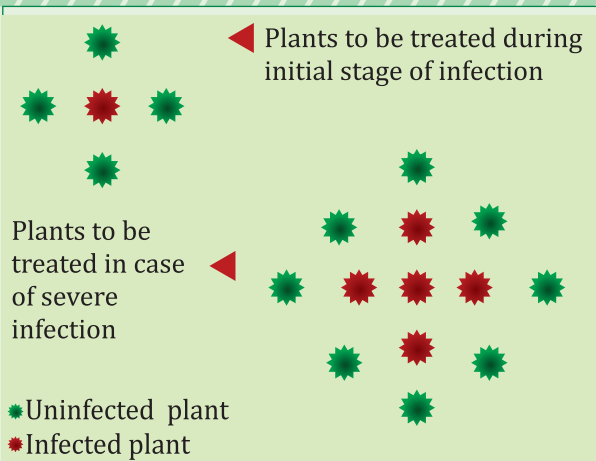
## Mulberry Root Protector

A broad spectrum eco-friendly bioformulation of microbial consortia for management of root rot disease in mulberry



A unique bioformulation of CSRTI-Mysuru

**CSB-Central Sericultural Research & Training Institute**  
Central Silk Board, Min. of Textiles  
Govt. of India, Srirampura  
Mysuru-570 008



### Instructions

- It is advised to apply **Mr. Pro.** at initial stages of infection, immediately after seeing sudden withering of leaves and wilting symptoms of plants for better results and revival of the affected plants.
- Remove the dead mulberry plants completely, burn and expose the soil to sunlight.
- Replant with new saplings, after dipping roots in 0.5 % **Mr. Pro.** solution for 20 minutes.
- Treat the surrounding plants also to prevent spread of the disease.
- Maintain sufficient moisture during the application and after application.
- Apply sufficient quantity of compost /manure to increase soil organic carbon content.
- Keep the soil moisture level above 40% to prevent the spread of disease.
- Before taking up new mulberry plantation, expose the soil to sun light by deep digging and ploughing.

### Precautions

- Keep **Mr.Pro.** in a cool and dry place.
- Keep the product out of the reach of children.
- Do not expose the product to direct sunlight.



#### Text:

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## Root rot disease of mulberry

It is a major constraint in mulberry cultivation due to its epidemic nature and potential to kill the plants completely, resulting in leaf yield loss of up to 31.5%. Various types of root rots such as dry root rot caused by *Fusarium solani* & *F. oxysporum*, black root rot by *Lasiodiplodia theobromae*, charcoal root rot by *Macrophomina phaseolina* and Rhizopus rot by *Rhizopus oryzae* have been reported in mulberry. Management of all the root rot diseases can be achieved by the application of **Mr. Pro. - A broad spectrum eco-friendly bioformulation of microbial consortia** available both in solid and liquid form.

## Symptoms and Disease Development

- The disease is characterized by sudden withering of leaves, wilting and defoliation, followed by decaying of roots and plant death.
- The higher disease severity was noticed in soils having low organic carbon (OC) content and higher pH, coupled with less moisture (<40%) and high soil temperature (30-35°C).
- The disease initially appears in few plants in isolated patches, which act as source of infection, subsequently leading to mortality of large number of plants within a short span.



Wilting



Drying



Rotting

- The pathogens enter into the root cortex, establish, colonise and form numerous blackspores.
- As the cortex around root dry, it disintegrates the cortex and root decays. The infected plants can be easily pulled out.
- Pathogens remain dormant and when soil micro-climate changes due to various factors; they become infectious causing severe damage to the plantation.
- Formation of disease complex by several root rot causing pathogens, and also association of root-knot nematode with root rot has been reported.

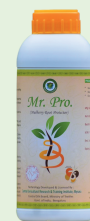
## Method of application

- Apply 0.5% **Mr. Pro.** (5 g solid or 5ml liquid per litre of water) solution by drenching to root zone of the affected and surrounding healthy plants.
- The quantity of above solution need to be prepared based on the age and spacing of the plants (~5-10 litre solution per plant).
- The field efficacy and durability of biological control against root rot causing pathogens can be enhanced through the application of **Mr. Pro.** by mass multiplying it in well-decomposed FYM for 8-10 days in a 1:50 ratio which is sufficient for 50 plants (~1 kg/plant).

Solid  
Formulation



Liquid  
Formulation



## Advantages of Mr. Pro.

- This broad spectrum bioformulation of microbial consortia is eco-friendly and effective against all root rot disease causing pathogens.
- The bioformulation consists of compatible antagonistic bacteria and fungus combination.
- If one isolate fails to offer protection in a specific soil condition, another isolate will step in to protect the plants from disease causing pathogens.
- It has got unique features for maintenance of bacterial cell viability and shelf life of the product due to different components in the carrier materials.
- Additionally, these microbes have PGPR activity and empowers faster bud sprouting.
- Bacterial isolates are found to be tolerant to fungicides used in mulberry cultivation.
- **Mr. Pro.** is comparatively low cost technology for management of root rot in mulberry.



Mix 5 g solid/5ml  
liquid per litre  
of water

Step-1



Apply 10 litres  
solution  
per plant



Mix Mr. Pro.  
& FYM @ 1:50  
ratio

Step-2



Apply 1 kg FYM mixture  
per plant  
after 8-10 days